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(73) Proprietor: **TWYDALE TURKEYS LIMITED**
Wansford Road
Driffield North Humberside YO25 7NJ (GB)

(72) Inventor: **Clancy, John**
The Hollies North Dalton
Driffield Yorkshire (GB)

(74) Representative: **Lynd, Michael Arthur et al**
STANLEY, POPPLEWELL, POOLE 57 Lincoln's Inn Fields
London WC2A 3LS (GB)

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Description

The present invention relates to the treatment of poultry carcasses to enhance properties such as succulence, flavour and tenderness and/or to improve surface browning.

There is known a process in which fat is injected into a raw dressed poultry carcass so that during cooking, the fat will melt and exude onto the skin thus to baste it. It is therefore necessary when injecting the carcass to heat the fat to melt it; the temperature of the injected carcass is thus caused to rise and hence a greater quantity of heat has to be removed from the carcass in a subsequent step of freezing the carcass for preservation and storage.

According to a first aspect of the present invention there is provided a method of treating poultry carcass meat characterised in that it comprises injecting into the meat an aqueous liquid containing whole milk constituents.

The presence of the aqueous liquid of the present invention increases the succulency of the bird when cooked and enhances its flavour. The milk constituents in the liquid are believed to assist in lightening the colour of the poultry meat which is particularly advantageous in respect of breast meat and additionally imparts a pleasant "creamy" flavour to the bird.

It is thought unlikely that any fat contained in the aqueous liquid has an appreciable basting action upon the skin of the bird.

The milk constituents may actually be milk the composition of which may have been altered e.g. by reducing the fat or cream content, or may be derived from a dried or concentrated milk or skimmed milk.

Preferably the solution is made up from powdered or granulated milk. Powdered or granulated milk is preferred over liquid milk because it is easier to maintain hygienic and sterile conditions during use and storage.

Very preferably the liquid is composed of water in which has been dissolved salt and powdered or granulated skimmed milk. The salt acts as a flavour enhancer.

It is also preferred that the liquid contain a quantity of honey. When honey is present and the injected liquid is allowed to exude out onto the skin of the bird during cooking the honey has been found to promote browning of the skin of the bird, possibly by the dextrose therein being caramelised during cooking. The honey also imparts a pleasant flavour to the bird.

The powdered or granulated milk may be present in the liquid in an amount of from about 12 to about 25 parts per 100 parts of water, the salt may be present in an amount of up to about 10 parts per 100 parts of water and the honey, if present, may be in an amount of up to about 5 parts per 100 parts of water.

It has been found preferable that the liquid be injected in an amount of from 1% to 10% by the weight of the carcass meat.

The liquid most preferably comprises per 100 parts by weight of water, 20 parts by weight of skimmed milk powder, 5 parts by weight of salt and approximately $\frac{1}{2}$ part by weight (i.e. $\frac{1}{2}$ oz in 1 gallon of water which is equivalent to 14.2 g in 4.6 l of water) of honey.

In an important modification of the invention the aqueous liquid is cooled, preferably to near its freezing point, before injection into the carcass whereby the carcass is chilled by the injection liquid, thus facilitating a subsequent freezing step. Moreover the use of a low temperature injection medium reduces the possibility of bacterial growth and contamination.

The presence of the aqueous liquid of the present invention increases the succulency of the bird when cooked and enhances its flavour.

According to a further aspect of the present invention there is provided poultry carcass meat which has been injected with an aqueous liquid containing salt and whole milk constituents.

The present invention further provides an aqueous liquid for injection into poulty carcass meat which liquid contains whole milk constituents, salt and honey.

The liquid may also contain one or more additives such as are commonly used in the art, such as conventional phosphate salts, permitted flavouring agents, permitted colouring agents, tenderizing agents, binders etc., as desired.

In a particular embodiment of the invention a dried skimmed milk powder is employed, the assay of which is as follows:—

Lactose (carbohydrate)	52% By weight
Protein	36% By weight
Ash	8% By weight
Moisture	3.2% By weight
Fat	0.8% By weight
Calorific value	346 Cals/100 gms (1,45 KJ/100 g)

This product is commercially available under the trade mark "MILQUIK".

The aqueous liquid is prepared by adding to tepid water in a stainless steel tank 5 parts by weight per 100 parts of water of pure vacuum salt and 1 part per 100 parts of water of honey. These constituents are dissolved therein by stirring. Skimmed milk powder is then dissolved in tap water until a mixture of a thick cream constituency is formed and this mixture is then mixed with the salt and honey solution in an amount of 17 parts of skimmed milk powder per 100 parts of water. After transferral to a stainless steel bulk storage tank the solution is cooled, with constant agitation, to a temperature less than 40°F (5°C).

A turkey carcass, which has been eviscerated, washed, cooled in ice water overnight to bring it to a temperature of from −18°C to +5°C (0° to 40°F) and drained, is then injected with the cooled aqueous liquid in an amount of 5% by weight of the carcass. The breast is injected from above using any suitable proprietary metering pump, e.g. an 'Autarky' pump preferably employing an inverted V-shaped plate provided with, on each of the lower most faces of the V, six injection needles, the location of which on the plate can be adjusted. Thus the entire breast can be injected in one operation. The thighs of the bird are injected with the liquid using a twin needle injection pump. Thereafter neck and giblets are sent into the cavity of the bird and the bird is then bagged, weighed, shrink-wrapped and frozen in a bath of calcium chloride solution at −29°C (−20°F).

The present invention thus provides an improved method of treating a poultry carcass in which a pleasant flavour can be imparted, in which browning of the exterior of the bird is promoted, in which a freezing step during processing of the carcass can be rendered more efficient and in which the risk of bacteriological contamination is reduced.

Claims

1. A method of treating poultry carcass meat for roasting, characterised in that it comprises injecting into the meat an aqueous solution containing per 100 parts of water, more than 12 parts of substantially whole milk constituents and less than 10 parts of salt, the solution being injected in an amount of from 1 to 10% by weight of the carcass meat.

2. A method as claimed in claim 1, characterised in that the milk constituents comprise powdered or granulated milk.

3. A method as claimed in claim 1 or 2, characterised in that the solution includes honey.

4. A method as claimed in claim 1, 2 or 3, characterised in that the aqueous solution comprises per 100 parts of water, from about 12 to 25 parts of powdered or granulated milk and up to about 5 parts of honey if present.

5. A method as claimed in claim 4, characterised in that the aqueous solution comprises per 100 parts by weight of water, 20 parts by weight of skimmed milk powder, 5 parts by weight of salt, and $\frac{1}{2}$ part by weight of honey.

6. A method as claimed in any one of claims 1 to 5, characterised in that the solution is cooled to near its freezing point before injection into the carcass.

7. Poultry carcass meat which has been injected with a solution as defined in any one of the preceding claims.

8. A solution for injecting a poultry carcass, as defined in any one of claims 1 to 6.

Revendications

1. Procédé de traitement de la viande de carcasse de volaille destinée à être rôtie, caractérisé en ce qu'il comprend l'injection dans la viande d'une solution aqueuse contenant pour 100 parties d'eau, plus de 12 parties d'à peu près l'ensemble des constituants du lait et moins de 10 parties de sel, la solution étant injectée suivant une quantité allant de 1 à 10 % en poids de la viande de carcasse.

2. Procédé suivant la revendication 1, caractérisé en ce que les constituents du lait comprenent du lait en granulés ou en poudre.

3. Procédé suivant la revendication 1 ou 2, caractérisé en ce que la solution comprend du miel.

4. Procédé suivant la revendication 1, 2 ou 3, caractérisé en ce que la solution aqueuse comprend pour 100 parties d'eau, de environ 12 à 25 parties de lait en poudre ou en granulés et, le cas échéant, jusqu'à environ 5 parties de miel.

5. Procédé suivant la revendication 4, caractérisé en ce que la solution aqueous comprend pour 100 parties en poids d'eau, 20 parties en poids de poudre de lait écrémé, 5 parties en poids de sel, et une demi partie en poids de miel.

6. Procédé suivant l'une quelconque des revendications 1 à 5, caractérisé en ce que la solution est refroidie jusqu'à environ son point de congélation avant l'injection dans la caracasse.

7. Viande de carcasse de volaille dans laquelle on a injecté une solution telle que définie suivant l'une quelconque des revendications précédentes.

8. Solution destinée à être injectée dans une carcasse de volaille, telle que définie suivant l'une quelconque des revendications 1 à 6.

Patentansprüche

1 Verfahren für die Behandlung von zum Braten bestimmten Geflügelfleisch, dadurch gekennzeichnet, daß in das Fleisch eine wässrige Lösung injiziert wird, die auf 100 Teile Wasser mehr als 12 Teile von festen milchbestandteilen und weniger als 10 Teile Salz enthält, wobei die Lösung in einer Menge von 1 bis 10 Gewichtsprozent des Fleiches injiziert wird.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die Milchbestandteile Milchpulver oder granulierte Milch enthalten.

3. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Lösung Honig enthält.

4. Verfahren nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die wässrige Lösung auf 100 Teile Wasser ca. 12 bis 25

Teile Milchpulver oder granulierte Milch und ggfs. bis zu 5 Teile Honig enthält.

5. Verfahren nach Anspruch 4, dadurch gekennzeichnet, daß die wässrige Lösung auf 100 Gewichtsteilen Wasser 20 Gewichtsteile entrahmtes Milchpulver, 5 Gewichtsteile Salz und $\frac{1}{2}$ Gewichsteil Honig enthält.

6. Verfahren nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Lösung bis nahe zu ihrem Gefrierpunkt abgekühlt wird, bevor diese in das Fleisch injiziert wird.

7. Geflügelfleisch, das mit einer Lösung, wie sie in einem der vorhergehenden Ansprüche definiert ist, injiziert ist.

8. Lösung für das Injizieren von Geflügelfleisch, wie sie in einem der vorstehenden Ansprüche 1 bis 6 definiert ist.

German Offenlegungsschrift 1 692 573

A METHOD OF PREPARING POULTRY

Since time immemorial, turkey, chicken and similar poultry have been basted when roasted, in order to keep the moisture in the meat and make it juicy and more tastey, while simultaneously protecting the skin and making it edible and giving it the desired golden brown colour. Unfortunately basting, during which the meat juice from the pan is repeatedly poured over the poultry skin, usually involves interrtupting the roasting process, withdrawing the pan from the oven and so on, during which there is a risk of burning one's hands, spraying liquid outside the pan, etc. A considerable advantage in this sector would be obtained if basting were possible without interrupting the cooking process and without removing heated liquids from the pan, while simultaneously retaining the advantages of basting.

It has now been found according to the invention that if an edible fat is introduced into the carcase under the skin, the basting material can migrate outwards through the openings in the skin and thus continuously and automatically supply edible fat to the skin during the cooking or basting process. Without taking the poultry carcase out of the oven, the basting fat is automatically distributed over the poultry skin. At the same time the fat for basting is supplied to the inside of the skin, resulting in a double basting effect during cooking.

After the basting fat etc has been introduced into the carcase, the skin can retain the fat and can be externally washed, resulting in a light-coloured, clean fat-free surface in the plastic sheath in which the poultry is packed.

It has also advantageously been found that when phosphates in non-aqueous suspension e.g. in an edible fat are introduced into the meat, the phosphate easily penetrates from the fat into the natural poultry juices whereas the fat remains relatively stationary in the deposits near the place of introduction. After the phosphate has penetrated into the muscle parts of the flesh and made the flesh tender and juicy, the phosphate-free fat can flow outwards during the cooking or roasting process and automatically baste the poultry.

According to the invention therefore a raw poultry carcase ready for roasting is provided, containing an edible fat which is automatically introduced and distributed over the poultry during the cooking process. The invention also relates to a method of processing raw prepared poultry carcases or bodies by incorporating an edible fat which is automatically discharged through the surface of the poultry when cooked.

The invention also relates to a poultry carcase which is automatically basted by supplying edible fat under the skin and in the muscle part. The invention also relates to a method and product

wherein a fat for basting a raw poultry carcase is introduced under the skin and used in the ducts through the skin for distributing the fat over the carcase during the cooking process.

The invention also relates to a method of processing poultry or parts thereof wherein phosphates are temporarily suspended by agitation in an edible fat and the mixture is injected into the meat.

The invention will now be explained in further detail with reference to the accompanying drawings, in which:

Fig. 1 shows a cross-section through a turkey, wherein edible fat is introduced according to the invention under the skin of the turkey;

Fig. 2 is a cross-section through a turkey wherein edible fat is introduced not only under the skin but deep into the pectoral muscle of the turkey in order to insert edible fat, and

Fig. 3 is a perspective view of a needle injection device for working the method according to the invention.

In the drawings, A denotes the raw carcase of a prepared turkey, wherein the pectoral muscle or part is marked by the reference number 10. The skin 11 extends over the breast part 10. The breast parts 10 are separated by the bone 12, which extends above

the body cavity 13. The spine 14 and ribs 15 are situated under the body cavity. The leg muscles are indicated by the reference number 16 and the muscular flesh thereon is indicated by reference 17. The skin 18 surrounds the leg part 17.

As shown in the drawings, an edible fat substance 19 is introduced by using suitable devices such as a syringe, the syringe needle being inserted through the skin 11 and moved under the skin so as to distribute the fat in a line at an angle to the breast or in any other desired manner over the breast muscle 10. If desired, the fat can be introduced from the body cavity 13 through the muscle part 10 until it comes near the skin 11. The skin 11 can be formed with a number of perforations or openings 20 through which the edible fat can flow and be uniformly distributed over the skin during the cooking process. The openings or passages 20 can be formed at the time when the fat is introduced or, if desired, the housewife can make the perforations with a fork before inserting the poultry into the oven.

Preferably the edible fat is inserted deeply into the breast muscle 10 as shown in Fig. 2. In this process the edible fat 24 is introduced into the breast muscle of the turkey by needles disposed in spaced-apart side openings 22 and connected to a distributing line 23, and the edible fat 24 is distributed by the needles 21 inside the breast as shown by an arrow 25 on the right-hand side of Fig.

2. Deposits of fats are thus formed inside the turkey breast and flow passages 21a are simultaneously formed by the needles 21, so that the fat can then flow through the ducts 21a and the skin openings 20a to the outside of the skin 11 in order uniformly to distribute the fat over the skin during the cooking process. Since the fat is introduced inside the breast 10 in gradual layers, it is found that when the poultry is cooked, the fat at the top is first melted and brought to the surface of the skin and then, as cooking proceeds, the deeper fat deposits are brought up to the surface through the needle ducts by the juices in the breast, so that the fat is distributed over the skin 11. The resulting fat reservoir is used for gradual continuous automatic distribution of the fat for basting over the skin. It has also been found that during the cooking or roasting process the skin tends to come more completely loose from the breast muscle 10 and the fat reaches the inside of the skin, resulting in a double basting effect.

Any suitable fat-injecting device can be used. In Fig. 3 a distributing container 23 with needles 21 and side openings 22 is provided, wherein the needles have different lengths and the operator injects the fat for basting into the poultry carcase breast in a single operation. Edible fat, including edible oil, is supplied from a storage container through a flexible line 26; the flow from the distributing container 23 is controlled by a valve 27 actuated by a handle 28. The same mechanism can

advantageously be used for injecting fat into the leg muscle 17 of the turkey or of any other poultry.

A surprising fact, when operating the injection device shown in Fig. 3, is that the skin 11 of the poultry carcase moves freely as soon as it comes into contact with the needles 21. It has been shown that usually, when the instrument for withdrawing the needles is taken away, the opening 20a in the skin is not in line with the needle ducts 21a through the muscle 10, as shown on the left side in Fig. 2. This faulty alignment, due to the tendency of the skin to move immediately it is grasped, is an advantage, since the skin then seals the needle passages through the breast muscle 10 so that, immediately after injection, the edible fat has practically no tendency to flow out and on to the skin. The skin of the prepared poultry carcase expands and moves towards the fixed body muscle 10 by about an inch during processing of the poultry. This movement, which bends the skin irrespectively of the breast muscle 10, further facilitates injection of edible fat under the skin as shown in Fig. 1.

Any suitable edible fat can be used, preferably an edible fat such as conventional animal fat, oils or emulsions, or mixtures thereof. "Edible fat" covers fats and oils such as butter, butter oil, corn oil, dripping, margarine, cotton seed oil and other known vegetable and animal fats and oils. Edible fats and other glycerides having the properties of such fats

are preferably used. The edible fat only needs to be heated to a temperature at which it becomes fluid or plastic, so that it can be introduced through the skin and into the meat body by the applicator or through the needles.

The size of the needles can vary with the nature of the injected edible fat. For example, needs can be used having a diameter between 0.46 and 6.35 mm (0.018 inches to 1/3 inch). The needles should be large enough to form a passage through which the edible fat can be moved by the body pieces during the cooking or roasting process, so that the fat is distributed over the outer skin. If the edible fat used is butter, special results have been obtained with needles about 0.0535 cm (21 gauge) or more in diameter. Since the body juices contain protein and the protein coagulates, the ducts inside the said region reduce any blockage through coagulation and also the edible fat itself lubricates the ducts and helps to prevent the basting fat from flowing away.

The proportion of basting fat can vary within wide limits, e.g. in the range from about 0.2 to 20 wt.% relative to the weight of the carcase. If butter is used, the preferred range is between about 1 and 10 wt.%.

The edible fat can be used alone or in combination with phosphate salts. The phosphates can be any non-cyclic phosphoric acid salt of sodium or potassium with an H_2O/P_2O_5 ratio of about 0.9:1 to

about 2.0:1. The preferred polyphosphate is sodium tripolyphosphate. Sodium hexamethaphosphate, tetrasodium pyrophosphate, tetrapotassium pyrophosphate and potassium tripolyphosphate are other preferred phosphates. All the said salts have a specific weight greater than that of edible fat and tend to form deposits at the bottom of the container when mixed with edible fats at temperatures at which most of the fat is in liquid form. Considerable stirring is necessary in order to obtain a temporary suspension of the salts in the fats.

In order to keep the phosphate salt, preferably the sodium tripolyphosphate, in suspension in the edible fat during mixing in the poultry, the mixture is rapidly agitated and the size of the phosphate particles is preferably reduced e.g. by using a colloid mill, so that these particles can be held in suspension by moderate agitation during the injection process. The sodium polyphosphate salt is then used to retain natural juices in the muscle parts of the poultry, whereas the edible fat is used in spaced-apart deposits in order to apply the fat to the outer skin for basting.

The proportion of polyphosphates is not critical but is preferably in the range from 0.01 to 10.0% of the weight of the carcase. The best results are obtained by using a range from 0.25 to 4.5%. The fat can also be used over a wide range, and it is sufficient if the fat serving as a support is able

physically to hold the phosphate and introduce it into the poultry meat. Usually the range is between 0.1 and 10% relative to the weight of the carcase, the preferred portion being between about 2 and 4%.

The fat and phosphate mixture can be injected into the dark meat as well as the breast parts, but it has been found that the greatest advantage is obtained by injecting the mixture into the breast parts of the poultry.

It has also been found that gases such as air, nitrogen, CO_2 etc can be incorporated in the fat medium for obtaining a viscous consistency so as to suspend the phosphate and enable the material to be pumped and injected through the needles into the poultry meat. In order to obtain an air inclusion, the temperature of the fat is preferably increased and the fat is beaten at the said high temperatures in order to introduce air bubbles into it. Cooking or baking margarine for example encloses air and provides the desired consistency, when the phosphate is suspended at a temperature of about 38°C (100°F) whereas table margarine and butter gives the best results at 27°C (80°F). If the mixture is inserted through the needles which expand the muscle meat, and the needles are withdrawn, the pressure exerted on the structure breaks the bubbles and the phosphate quickly migrates, as in the case without an air inclusion.

Since the fatty material such as butter or margarine, remains in separate aggregates inside the muscle region of the filtrate after migration of the phosphates, the fat can be used as a carrier for certain flavours, the butter flavour, intensive butter flavour, and oil-soluble flavourings. For example the butter flavour can be increased by heat-treatment of cream containing butter fat with an enzyme, e.g. the enzyme obtained from calf's throat, thus generating free fatty acids consisting mainly of butyric acid. This gives the butter an intensified butter taste. Similarly margarine oils can be mixed with lipolysed cream of the same kind, giving the margarine a natural butter taste. If cream containing butter fat with a lipase enzyme is heat-treated (incubated), forming short-chain free fatty acids up to a titratable acidity of about 0.70 to 1.20, calculated as lactic acid, is obtained and the cream is mixed with margarine emulsion after incorporation of the lipase, the margarine can be given a stronger than ordinary butter taste. It has been found that the build-up of the short free fatty acid fraction of the butter or margarine through action of lipase does not impede the rapid migration of phosphates from a said carrier material. These fats can also be used where an additional butter taste is desired.

The method can be used to inject the phosphate and fat into the raw poultry carcase after the poultry has been taken out and the carcase is still warm. Alternatively injection can be effected after

cooling and freezing the carcase. Injection can also be made into parts of the poultry instead of into the entire carcase.

After the edible fat has been injected into the poultry carcases through needles in the manner described, the carcases can be cooled or frozen. It has been found during this procedure that fat, e.g. butter or the like, solidifies inside the needle passages and leaves the passage intact so that later, when the carcase is cooked, the passages actually serve as flow passages for the molten edible fat, which is driven by juices etc towards the openings in the skin.

The prepared poultry carcases treated in the manner described can be turkeys, chicken, spring chickens, capons, geese, ducks, pheasants and the like.

The following examples illustrate the invention without limiting it.

Example I

Turkeys weighing 8 pounds, frozen and thawed out to an average carcase temperature of 10°C (50°F) were treated by injection of 40 ccm of the following substances on each side of the turkey breast:

a) butter with 10% pulverulent tripolyphosphate
b) solution of 10% tripolyphosphate in water
c) butter alone and
d) control - no injection.

After roasting, the turkeys were tested for taste, tenderness and juiciness. The turkey injected with butter and phosphate was the best of all the samples tested. The turkey injected with butter alone was the next as regards taste, tenderness and juiciness.

Example II

A turkey weighing 12¾ pounds (English) when thawed was given a butter injection of 340 g (12 ounces) in one half of the breast through a 0.45 mm (18 gauge) needle. The turkey was then roasted or broiled, without being covered, in an oven at a temperature of 160°C (320°F). During roasting, the injected butter flowed gradually over the surface of the turkey, giving it a golden-brown moist appearance as after conventional basting, whereas the non-injected control half of the breast had a dry surface.

Example III

About 20 holes were made in one side of a turkey weighing 17 (English) pounds, using a 0.432 mm (24 gauge) needle. On the other side, 155 g (5½ ounces) of melted butter were injected into the breast through a 0.533 mm (21 gauge) needle. The side of the turkey injected with butter was satisfactorily basted through about 2/3rds of the holes during roasting in the gas oven at a temperature of 160°C (320°F); the results were similar to those described in Example 1.

Example IV

A 17-pound (English) turkey was injected with about 60 ccm vegetable oil using a 0.508 mm (18 gauge) needle along a line of holes on the top right side of the breast near the bone 12. Holes were drilled by 1/8-inch needles through the left side of the breast without introducing the oil. During roasting, some basting due to the outflow of natural juices occurred on the left side of the turkey where no oil had been injected, although most of the skin surface was dry. Basting through the small holes on the side injected with vegetable oil ceased after a while, about half way through the roasting time. The larger (1/8-inch) holes through which oil was injected maintained the basting process during the entire roasting operation. The right side of the turkey breast acquired a golden brown, moist, basted appearance whereas the left side had a dry surface. The turkey skin through which the needles were inserted in order to inject oil into the breast tended to move into a position where the openings in the pectoral muscle were covered after the needles had been removed, so that the injection area could be effectively washed to obtain a clean attractive carcase surface ready for insertion into plastic covers.

Example V

A group of freshly-cooled turkeys ready for roasting and weighing about 12 (English) pounds were injected with a butter mixture into the breast through an applicator shown in Fig. 3 and into the legs through

a similar device containing fewer needles. The turkeys were roasted by a number of conventional methods and acquired the appearance described in particular in Example II. When injecting edible fat into the leg muscles, it is preferable to use a distributor and a needle injector similar to that shown in Fig. 3 but with fewer needles, e.g. a collecting container as shown on the right side of Fig. 2 comprising a container 23a and needles 22a.

Example VI

An attempt was made to investigate the migration of a non-aqueous butter substance after injection into the turkey breast meat. An oil-soluble dye (red 0) was used for following the oil phase and FD&C blue No. 1 - aluminium red was used to simulate the migration of a substance such as tripolyphosphate. 60 ccm of the "red" butter was injected into one side of the turkey and 60 ccm of the "blue" butter was injected into the other side. The injected turkey was left overnight in a refrigerator and roasted and observed on the following day at an internal temperature of 85°C (185°F). The red oil-soluble dye remained suspended in the butter and was not transferred to the meat. The dye migrated with the butter. The blue water-soluble dye had been deposited in the meat, showing that a substance not soluble in oil could be transferred to the meat tissue.

Example VII

A comparison of butter plus phosphate and strongly flavoured margarine with sodium tripolyphosphate was made. About 30 ccm of the following substances was injected into each side of turkey breasts at a temperature of about 4.5°C (40°F) and each weighing about 9 (English) pounds:

a) control - no injection
b) 90% butter plus 10% phosphate
c) 20% highly flavoured margarine plus
   70% normal margarine plus
   10% phosphate
d) 45% highly flavoured margarine plus
   45% normal margarine plus
   10% phosphate.

The butter and margarine were heated to about 38°C (100°F) and mixed with the phosphate at this temperature. The mixture was then constantly stirred, thus keeping the phosphate in suspension. The hot mixture was injected into the turkeys through a bacon pickling pump, using needles with an outer diameter of about 3/16th of an inch. Each needle contained 8 holes spaced apart by 1.28 cm and was 1.28 mm in diameter. 33 to 45 ccm of this material was injected into the turkey. After injection the turkeys were frozen after being packed in an aluminium foil. The turkeys, starting from frozen, were roasted for 3½ hours in an oven at 205°C (400°F). The aluminium foil was then removed and roasting was continued until the inner temperature

of the pieces was 82°C (180°F). After roasting the turkeys were tasted, and it was found that the turkeys containing highly-flavoured margarine were estimated by a number of professional meat judges to be the same or better than turkeys treated with butter. All the turkeys injected were described as jucier, tenderer and more tastey than those without injections.

Example VIII

Two turkeys each weighing about 9 (English) pounds were injected on one side of the breast with 30 ccm margarine containing 5% tripolyphosphate, whereas the other side was injected with 30 ccm margarine containing 10% tripolyphosphate. The tenderness of the roasted turkey-breast meat was compared, using a Lee-Kramer shearing press. The average force needed to cut five successive 3-mm thick slices of breast meat is given in the following table:

Treatment	Average force applied
Control	-
Margarine + 5% sodium tri-polyphosphate:	3% less
Margarine + 10% sodium tri-polyphosphate:	11% less

Example IX

Turkeys weighing about 10 (English) pounds at a carcase temperature of about 10°C (50°F) were injected with 30 ccm margarine on one side of the breast, using the other side as a comparative

control. The turkeys were compared with similar turkeys injected with margarine containing 10% pulverulent sodium tripolyphosphate and compared with non-injected breast parts of the same poultry. After roasting, a test for tenderness showed that the force required to slice a turkey breast injected with margarine alone was about 1.6% less, and 15% less for slicing the roast turkey meat containing margarine with 10% phosphate. This shows the great value of phosphate dispersed in the muscle by the margarine.

Example X

If phosphate is added to the melted margarine or melted fats, it tends to settle at the bottom of the container. A process was developed for reducing the deposition of phosphate to a minimum by keeping the fat or margarine at a temperature at which air could be incorporated in the fat or margarine and produce a more plastic material. For example, cooking or roasting margarine was heated to a temperature of 38°C (100°F) and vigorously agitated with an electric agitator. The agitation introduced small air bubbles into the mixture. When pulverulent sodium tripolyphosphate was added to the mixture it remained in suspension and, after being pumped into the turkey by a pickling injection pump, the phosphate was uniformly distributed in the turkeys. The thus-injected turkeys could be compared with the turkeys injected with margarine without incorporation of air.

Example XI

Twelve turkeys weighing between 6 and 12 (English) pounds were injected with four different kinds of non-aqueous substances containing 10% sodium tripolyphosphate. The substances used were table margarine, vegetable oil (cotton seed oil), butter and cooking margarine. In addition to the 10% phosphate, the substances were mixed with 25% Flavour-Up margarine. The turkeys injected in this case, i.e. just half the breast of each, were compared with one another and with the common control piece. The test showed that all the injected turkeys were clearly preferred, indicating that all four kinds of non-aqueous substances were satisfactory carriers for the phosphate in the turkey. This improved the taste, moisture content and tenderness of the roasted turkey. If the same turkeys were cooled at 35°C for 24 to 72 hours and then tasted, the improvement in taste and consistency compared with the control meat was even more marked than with turkeys which had first been roasted.

Example XII

The method was the same as in Example VIII except that sodium hexamethaphosphate and tetraphosphate were used instead of tripolyphosphate, with comparable results.

Example XIII

Eight female turkeys cooled (4.5°C = 40°F) and aged in crushed ice for 16 hours were injected during the

usual packing process. The carcases were injected after draining and before packing. Margarine containing 10% tripolyphosphate and heated to 26°C (80°F) was injected through a double needle with 2 to 4% of the weight of the carcase. Excess injection material rapidly accumulated on the turkey surface and was wiped off, thus giving a carcase of desirable appearance after packing.

Eight turkeys mustered in the normal way were treated with margarine injections containing 10% tripolyphosphate, before packing and freezing. The roasted turkeys had an improved taste and the meat quality was also improved. Comparative tests were made on spring chickens, hens, capons, roasting chickens and geese and compared with the injected parts thereof. In all cases where turkeys or similar poultry were injected, the excess injection material was removed by wiping the injected region, and the result was a clean, attractive carcase surface apart from a few perforations in the skin caused by the injection needle.

When turkeys and similar poultry were injected, the holes were preferably made near the (breast) bone 12, so that the turkeys etc were automatically "basted" during roasting. The injection process thus improved not only the interior of the turkey meat but also the surface appearance and the tissue while the turkey was being roasted.

To sum up:

Fat injected alone is extremely useful for self-basting of poultry during cooking or roasting. If phosphates are introduced into the fat and temporarily suspended therein, the fat becomes a usable substance for introducing phosphates into the muscle parts without diluting the meat juices with water, whereas separate fat deposits are provided for self-basting.

C L A I M S

1. A method of processing a raw prepared poultry carcase, characterised in that an edible fat substance is introduced into the carcase under the skin in connection with flow ducts, and flow openings are formed in the skin and, when the carcase is roasted, come into contact with the flow ducts so that the edible fat at roasting temperatures flows through the opening on to the outside of the skin.

2. A method according to claim 1, characterised in that the added fat is introduced into the muscle parts of the carcase under the skin and is connected to the skin via flow ducts forming receiving and passage openings for the fat.

3. A method according to claim 2, characterised in that after the flow ducts have been formed in the muscle parts, the skin of the carcase is moved so as to close the flow ducts.

4. A method according to one or more of the preceding claims 1 - 3, characterised in that the fat is so incorporated in the muscle parts that spaced-apart deposits are formed therein and are connected to the flow ducts and form a fat reservoir, parts of which successively flow out during roasting, depending on their distance from the skin.

5. A method according to claim 4, characterised in that the deposits have a greater cross-section than the flow ducts.

6. A method according to one or more of the preceding claims 1 - 5, characterised in that the fat is solidified after introduction into the carcase.

7. A method according to claim 6, characterised in that the fat is strongly cooled.

8. A method according to one or more of the preceding claims 1 - 7, characterised in that a non-cyclic phosphoric acid salt of an alkali metal such as sodium or potassium is temporarily suspended in the edible fat during introduction into the carcase.

9. A method according to claim 8, characterised in that the phosphoric acid salt is sodium tripolyphosphate.

10. A method according to one or more of the preceding claims 1 - 9, characterised in that a non-cyclic polyphosphoric acid salt of an alkali metal such as sodium or potassium is mixed and agitated with the edible fat, resulting in a temporary suspension of the salt in the fat, and during the roasting process the salt is deposited out of the fat and the fat flows out and acts as a basting agent.

11. A method according to one or more of the preceding claims 1 - 10, characterised in that hollow needles are inserted through the skin and into the body part of the carcase to form the flow ducts, and the edible fat is introduced under pressure through the needles into each respective body part of the carcase.

12. A method according to one or more of the preceding claims 1 - 10, characterised in that the fat is introduced into the muscle parts from the cavity in the carcase.

13. A method according to claim 11 or 12, characterised in that the edible fat is butter and the hollow needles have a diameter of at least 0.46 mm.

14. A poultry carcase produced by the method specified in one or more of the preceding claims 1 - 13, characterised by spaced-apart flow ducts which extend in the muscle part of the poultry carcase and are connected to openings in the skin, and also characterised by edible fat in the said muscle parts and connected to the ducts so that at the roasting temperature the fat flows out of the carcase on to the outer skin for basting.

15. A carcase according to claim 14, characterised in that the edible fat contains a non-cyclic phosphoric acid salt of an alkali metal such as sodium or potassium.

16. A carcase according to claim 14 or 15, characterised in that the flow openings in the skin are not in line with the flow ducts in the muscle parts of the carcase.